CLAIMS

1. Transmitter arrangement, comprising:

a first modulation unit (50) having a first digital signal processor (52) and a first analogue signal generator (56);

said first digital signal processor (52) having a first digital signal input (51);

a first power amplifier (64), connected to an output of said first analogue signal generator (56);

a second modulation unit (70) having a second digital signal processor (72) and a second analogue signal generator (76);

said second digital signal processor (72) having a second digital signal input (71);

a second power amplifier (84), connected to an output of said second analogue signal generator (76);

combiner device (90) connected to outputs of said first and second power amplifiers (64, 84); and

transmitter device (91) connected to an output of said combiner device (90),

characterized in that said first digital signal processor (52) further comprises:

at least one first non-constant envelope modulation means (53);

a first signal component separator (65) connected to an output of said at least one first non-constant envelope modulation means (53);

a first output of said first signal component separator (65) being connectable to said first analogue signal generator (56);

first means for receiving modulation instructions (49);

at least one first constant envelope modulation means (54) connectable to said first analogue signal generator (56); and

first modulation selecting means (55) for connecting a modulation means to said first digital signal input (51) in response to received modulation instructions (49).

2. Transmitter arrangement according to claim 1, **characterized in that** said second digital signal processor (72) further comprises:

at least one second non-constant envelope modulation means (73) of the same type as said at least one first non-constant envelope modulation means (53); and

a second signal component separator (85) connected to an output of said at least one second non-constant envelope modulation means (73);

an output of said second signal component separator (85) being connectable to said second analogue signal generator (76);

a sum of a signal of said first output of said first signal component separator (65) and a signal of said output of said second signal component separator (85) being equal to a signal of said output of said at least one first non-constant envelope modulation means (53).

3. Transmitter arrangement according to claim 1, **characterized in that** a second output of said first signal component separator (65) being connectable to said second analogue signal generator (76).

4. Transmitter arrangement according to claim 1, 2 or 3, **characterized in that**
said second digital signal processor (72) further comprises:

second means for receiving modulation instructions (69);

at least one second constant envelope modulation means (74) connectable to said second analogue signal generator (76); and

second modulation selecting means (75) for connecting a modulation means to said second digital signal input (71) in response to received modulation instructions (69).

5. Transmitter arrangement according to claim 4, **characterized in that** said first and second modulation selecting means (55, 75) are operable on a time slot basis.

6. Transmitter arrangement according to any of the claims 1 to 5, **characterized by** further comprising:

first power monitor (93) sensing a total power to said transmitter device (91) or a quantity directly related thereto; and

phase-shifter (63) connected to said first power monitor (93), arranged for causing a phase shift of an analogue signal generated by said first analogue signal generator (56) in response to said sensed total power.

7. Transmitter arrangement according to claim 6, **characterized in that** said first power monitor (93) is a power meter of a load (92) of said combiner device (90).

8. Transmitter arrangement according to claim 6 or 7, **characterized in that** said phase-shifter (63) comprises means for complex multiplication of said phase shift ($\Delta\theta$) with a digital signal to be inputted to said analogue signal generator (56).

9. Transmitter arrangement according to claim 6 or 7, using GMSK modulation, **characterized in that** said phase-shifter (63) comprises means for introducing a phase offset ($\Delta\theta$) in said GMSK modulation, generated by using a table driven state machine in said first digital signal processor (52).

10. Transmitter arrangement according to any of the claims 6 to 9, **characterized by** means for providing said first and second digital inputs (51, 71) with the same digital signal, and said first and second means for receiving instructions (49, 69) with the same instructions of a constant envelope modulation, allowing transmitter coherent combining.

11. Transmitter arrangement according to any of the claims 6 to 10, **characterized by** further comprising:

second power monitor (96) sensing a power on said output of said first power amplifier (64) and being connected to said phase-shifter (63); and

third power monitor (97) sensing a power on said output of said second power amplifier (84) and being connected to said phase-shifter (63);

said phase-shifter (63) being arranged for causing a phase shift ($\Delta\theta$) in response to a comparison between said sensed total power and said sensed power on said output of said first and second power amplifier (64, 84), respectively.

12. Transmitter arrangement according to any of the claims 1 to 11, **characterized in that** said first and second non-constant envelope modulation means are selected from the list of:

4-PSK modulation means;

8-PSK modulation means (53, 73); and

means (220) for combination of at least two carriers.

13. Transmitter arrangement according to any of the claims 4 to 12, **characterized in that** said first and second constant envelope modulation means are GMSK modulation means (54, 74).

14. Method for generating a transmitter signal in a transmitter arrangement (45) having at least a first and a second modulation unit (50, 70) arranged in parallel, each one allowing for at least one non-constant envelope modulation and at least one constant envelope modulation, said first modulation unit (50) having a first analogue signal generator (56), said second modulation unit (70) having a second analogue signal generator (76), comprising the steps of:

providing digital signal (51, 71) to said first and second modulation units (50, 70);

providing modulation information (49, 69) to said first and second modulation units (50, 70);

creating a first input signal to said first analogue signal generator (56) by performing a constant envelope modulation of a first digital signal (51) provided to said first modulation unit (50) as a response of said modulation information (49) being a request for a constant envelope

modulation, and by performing a non-constant envelope modulation of said first digital signal (51) and separating a first component of said non-constant envelope modulated first digital signal as a response of said modulation information (49) being a request for a non-constant envelope modulation;

creating a second input signal to said second analogue signal generator (76) by performing a constant envelope modulation of a second digital signal (71) provided to said second modulation unit (70) as a response of said modulation information (69) being a request for a constant envelope modulation, and by performing a non-constant envelope modulation of said first digital signal (51) and separating a second component of said non-constant envelope modulated first digital signal as a response of said modulation information (69) being a request for a non-constant envelope modulation;

generating a first output signal in said first analogue signal generator (56) according to said first input signal;

generating a second output signal in said second analogue signal generator (76) according to said second input signal;

amplifying said first output signal;

amplifying said second output signal;

combining said first and second amplified output signals to form an analogue transmitter signal.

15. Method according to claim 14, **characterized in that** said providing steps are performed on a time slot basis.

16. Method according to claim 14 or 15, **characterized in that** said modulation information comprises a request for a non-constant envelope modulation, whereby said step of creating a second input signal to said second analogue signal generator (76) is performed on said first signal (51) in said first modulation unit (50), said method comprising the further step of transferring of said second input signal from said first modulation unit (50) to said second analogue signal generator (76).

17. Method according to claim 14 or 15, **characterized in that** said modulation information comprises a request for a non-constant envelope modulation, and said second digital signal (71) is identical with said first digital signal (51), whereby said step of creating a second input signal to said second analogue signal generator (76) is performed on said second signal (71) in said second modulation unit (70).

18. Method according to claim 16 or 17, **characterized in that** said non-constant envelope modulation is a 8-PSK modulation (53, 73).

19. Method according to claim 16 or 17, **characterized in that** said non-constant envelope modulation is a multiple-carrier GMSK modulation (220), whereby said method comprises the steps of providing a set of at least two digital signals to both said first and said second modulating units, whereby said creating steps comprise the steps of performing a GMSK modulation of each digital signal and digital combinating said modulated signals to form a non-constant envelope multi-carrier signal, whereby said separating step is performed on said non-constant envelope multi-carrier signal.

20. Method according to claim 14 or 15, **characterized in that** said modulation information comprises a request for transmitter coherent combining of a constant envelope modulation signal, and said first digital signal (51) is identical with said second digital signal (71).

21. Method according to any of the claims 16 to 20, **characterized by** the further steps of:

monitoring a power of said analogue transmitter signal or a quantity directly related thereto; and

shifting a phase of said first output signal according to said power.

22. Method according to claim 21, **characterized in that** said monitoring step comprises the step of measuring a power rejected during said

combining step, whereby said power of said analogue transmitter signal is provided as a complementary quantity.

23. Method according to claim 21 or 22, **characterized in that** said shifting step in turn comprises the step of adjusting an initial offset phase ($\Delta\theta$) of said first or second modulating in a guard period between two time slots.

24. Method according to claim 21 or 22, **characterized in that** said shifting step in turn comprises the step of adding a phase shift ($\Delta\theta$) in connection to the generation of the first output signal.

25. Method according to any of the claims 16 to 24, **characterized in that** said monitoring and phase shifting is performed when a constant envelope modulation with transmitter coherent combining is used, whereby said phase shifting is preserved when selecting a non-constant envelope modulation.

26. Method according to any of the claims 16 to 24, **characterized in that** said monitoring and phase shifting is performed during transmission of a constant amplitude period of a non-constant envelope signal.

27. Method according to any of the claims 16 to 26, **characterized by** the further step of measuring instantaneous power of said first and second analogue output signals, whereby said shifting is performed according to a comparison of said power of said analogue transmitter signal and said power of said first and second analogue output signals.

28. Method according to claim 27, **characterized in that** said shifting in the case of transmitter coherent combining is performed according to:

$$\phi_{shift} = \cos^{-1}(P_{TR}/(P_{TX1} + P_{TX2})),$$

where P_{TR} is said total power and P_{TX1} and P_{TX2} are said power of said first and second analogue output signals, respectively.

29. Method according to claim 27, **characterized in that** said comparison is performed during a period of a known training sequence in a time slot.

30. Method according to any of the claims 14 to 29, **characterized by** the further steps of:

reducing envelopes of said first and second signals when said modulated signal has a low amplitude.

31. Method according to claim 30, **characterized in that** said step of reducing envelopes comprises minimizing of power consumption.

32. Method according to any of the claims 14 to 31, **characterized by** the further step of:

storing an adjusted phase shift value for each one of a set of used frequencies.

33. Method according to claim 32, **characterized by** the further step of:

storing an adjusted phase shift value for each one of a set of used frequency generators (61A, 61B) for each of said used frequencies.
